

Appl. No. 09/941,300
Amdt. dated May 18, 2005
Reply to Office action of February 18, 2005

Amendments to the Claims:

Please amend claims 1, 4-9 and 12-14 as shown in the listing of claims below. This listing of claims will replace all prior versions and listings of claims in the application.

1. (currently amended) A reduced-state complexity equalizer apparatus for use with communication systems requiring equalization of a received signal subject to intersymbol interference (ISI), the apparatus comprising:

a first decision feedback equalizer device which utilizes coefficients derived from ~~the~~ an estimated channel response of a channel and forms tentative symbol decisions;

at least a second~~[[-]]~~ decision feedback equalizer device which utilizes coefficients derived from the estimated channel response and the tentative symbol decisions from the first decision feedback equalizer to truncate ~~the~~ a channel response of the channel to a desired channel memory; and

at least one non-linear equalizer device for providing equalization of the truncated channel response over the desired memory,

whereby ~~the~~ overall complexity of the equalizer is reduced by reducing ~~the~~ an effective delay spread of the channel.

2. (original) The reduced-state complexity equalizer apparatus of Claim 1, wherein the non-linear equalizer device includes a maximum-a-posteriori (MAP) equalizer device.

3. (original) The reduced-state complexity equalizer apparatus of Claim 1, wherein the non-linear equalizer device includes a maximum likelihood sequence estimator (MLSE) equalizer device.

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4. (currently amended) The reduced-state complexity equalizer apparatus of Claim 1, wherein the first~~[[]]~~ decision feedback equalizer device includes a feed-forward filter and a feedback filter, and at least one second decision feedback equalizer device that includes a feedback filter.

5. (currently amended) The reduced-state complexity equalizer apparatus of Claim 4, wherein ~~the~~ coefficients of the feedback filter of the second~~[[]]~~ decision feedback equalizer device ~~is~~ comprise a subset of those of the feedback filter of the first~~[[]]~~ decision feedback equalizer device.

6. (currently amended) The reduced-state complexity equalizer apparatus of Claim 4, wherein post-cursor interference is subtracted from ~~the~~ an output of the feed-forward filter in the first~~[[]]~~ decision feedback equalizer device and a hard symbol decision is made on this output.

7. (currently amended) The reduced-state complexity equalizer apparatus of Claim ~~[[1]]~~ 4, wherein the second~~[[]]~~ decision feedback equalizer device constructs partial post-cursor interference using the tentative decisions from the ~~output of the~~ first decision feedback equalizer, and subtracts the partial post-cursor interference from ~~the~~ an output of the feed-forward filter.

8. (currently amended) The reduced-state complexity equalizer apparatus of Claim 1, wherein ~~the~~ an output from the second~~[[]]~~ decision feedback equalizer is provided as input to the non-linear equalizer device.

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9. (currently amended) A method for reducing the complexity of an equalizer for use with a communication system requiring equalization of a received incoming signal subject to intersymbol interference (ISI), the method comprising the steps of:

deriving feedback and feed-forward coefficients for the associated feedback and feed-forward filters of a first and at least one subsequent decision feedback equalizer from the an estimated channel response of a channel;

utilizing the first decision feedback equalizer to form tentative decisions regarding certain symbols;

utilizing at least one subsequent decision feedback equalizer to truncate the channel response to a desired memory; and

utilizing at least one non-linear equalizer for providing equalization of the truncated channel response over the desired memory,

whereby the overall complexity of the equalizer is reduced by reducing the an effective delay spread of the channel.

10. (original) The method for reducing the complexity of an equalizer of Claim 9, wherein the non-linear equalizer includes a maximum-a-posteriori (MAP) equalizer device.

11. (original) The method for reducing the complexity of an equalizer of Claim 9, wherein the non-linear equalizer includes a maximum likelihood sequence estimator (MLSE) equalizer.

12. (currently amended) The method for reducing the complexity of an equalizer of Claim 9, wherein the step of utilizing the first~~[[]]~~ decision feedback equalizer includes reconstructing post-cursor interference using decisions made on previously detected symbols, subtracting the post-cursor interference from the an output of the feed-forward filter, and making a hard symbol decision on this output.

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13. (currently amended) The method for reducing the complexity of an equalizer of Claim 9, wherein a further step of utilizing the second[[-]]_decision feedback equalizer includes: reconstructing partial post-cursor interference using the hard symbol decision from the first[[-]]_decision feedback equalizer[,]) and subtracting the partial post-cursor interference from the an output of the feed-forward filter, ~~and saving the~~ to obtain an output of the second decision feedback equalizer.

14. (currently amended) The method for reducing the complexity of an equalizer of Claim 13, wherein a further step of utilizing the non-linear equalizer includes: providing the output from the second[[-]] decision feedback equalizer as the an input to the non-linear equalizer.